Axial Spinal Decompression

The non-invasive option for your patients

Dr. Timothy J. Burkhart has indicated he is a clinical consultant for Hill Laboratories and HillDT Solutions.

Agenda

1. **Anatomy and Physiology**
   - Design features of the disc
   - Nutrition of the disc
   - Nomenclature
2. **Decompression Technology**
   - The “why” of spinal decompression
   - Decompression research
   - Biomechanics of decompression
3. **Decompression Treatment**
   - Indications for treatment
   - Contraindications
   - The “how” of decompression
4. **Implementation into Practice**
   - Implementation
   - Case studies
   - Open discussion

Anatomy and Physiology

The non-invasive option for your patients

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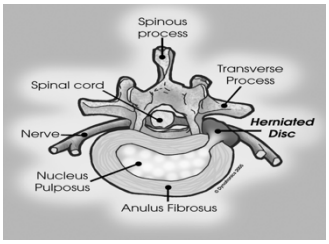
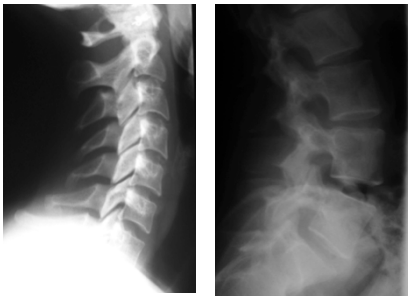
Anatomy and Physiology

Design features of the disc.



Anatomy and Physiology

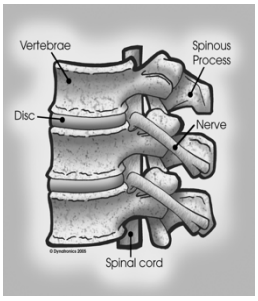


Anatomy and Physiology

Anatomy and Physiology

Design features of the disc

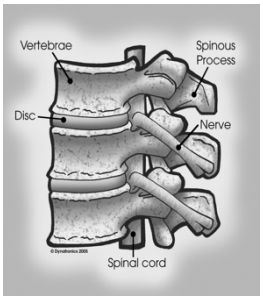
The intervertebral discs are designed to separate vertebrae, producing a potential space between them into which the vertebral bodies can dip and execute bending movements.



Anatomy and Physiology

Designs features of the disc

- In order to allow movement, the tissue of the disc must be pliable.
- The tissue must also be strong in order to sustain the compression loads between the vertebral bodies.



Anatomy and Physiology

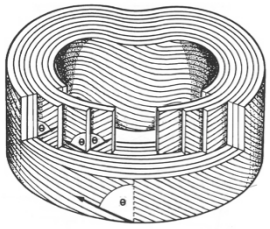
Design features of the disc

- The essential component of the disc is the **annulus fibrosus**.
- The AF consists of sheets of collagen, called **lamellae**, which are tightly packed together around the periphery of the disc.
- The lamellae are stiff, and can sustain considerable compression loads.

Anatomy and Physiology

Design features of the disc

The collagen fibers are arranged in 10-20 concentric, circumferential bands. The orientation of these fibers alternate in successive lamellae, but their orientation is approximately the same, and measures about 65 degrees.



Anatomy and Physiology

Design features of the disc

- Being collagen, the annulus fibrosus is sufficiently pliable that it can deform and thereby enable bending movements between vertebral bodies.
- However, herein lies the liability of the AF. If it buckles it loses its stiffness, and is less able to sustain compression loads.

Anatomy and Physiology

Designs features of the disc

- To prevent this buckling, the annulus fibrosus requires the second component of the intervertebral disc, the **nucleus pulposus.**
- The NP is a hydrated gel located in the center of each disc. When compressed, this semi-fluid mass expands in a radial fashion.
- Co-operatively, the nucleus pulposus and annulus fibrosus maintain the stiffness of the disc against compression loading.
- Both tissues are sufficiently pliable that they allow some degree of movement between vertebral bodies.

Anatomy and Physiology

Design features of the disc

- The third component of the intervertebral disc are the superior and inferior vertebral **endplates**.
- These are plates of cartilage that cover the inferior and superior aspects of the disc, and bind the disc to their respective vertebral bodies.

Anatomy and Physiology

The structure of a lumbar disc:

- Nucleus pulposus (NP)
- Annulus fibrous (AF)
- Cartilaginous vertebral endplates (VEP)

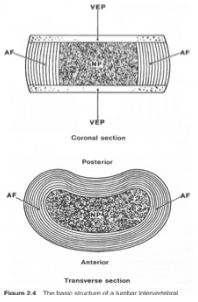


Figure 2.4 The basic structure of a lumbar intervertebral

Bogduk, 1997 Clinical Anatomy of the Lumbar Spine and Sacrum

Nutrition of the Disc

- Lumbar intervertebral discs receive a relatively poor blood supply.
- **No arteries enter the disc.**
- Their blood supply is limited to tiny blood vessels that ramify over the surface of the annulus derived from the external arteries that supply the adjacent vertebral bodies.

Anatomy and Physiology

- The functional capacity of the spine is in the disc.
- Discs heal through cycling loading & unloading.
- Cyclic loading and unloading of the intervertebral disc retores normal disc mechanics through fluid transport; fluid exudation and recovery may be integral to maintaining adequate disc nutrition and preventing degeneration.

(Johannesson 2004)

Nutrition of the Disc

- Nutrition to the disc is improved and aided by **movement**, for movement causes bulk flow of water into and out of the disc, and this bulk flow carries nutrients with it.
- The supply of metabolites to cells within the intervertebral disc is barely adequate for **normal** requirements and impaired metabolite transport is associated with disc degeneration.

Nachemson A 1982 Nutritional changes in the canine intervertebral disc after spinal fusion Clinical Ortho 243-258

Nutrition of the Disc

Recent cell-culture experiments suggest that nucleus pulposus cells are tolerant of low oxygen concentrations, but die if the extra cellular concentration of glucose falls below a critical level for a period of several days.

Since the strength of the disc is related to the fluid it is able to imbibe, a drop in the proteoglycan content leads to further disc injury. This may rapidly lead to the **onset** of disc degeneration, perhaps within days, weeks or months not necessarily over several years.

Horner H, Urban J P G 2001 The effect of nutrient supply on viability of cells from the nucleus of the intervertebral disc. Proceedings of the International society for the study of the Lumbar Spine, Edinburgh UK

Nutrition of the Disc

Advanced aortic atherosclerosis presenting as calcified deposits in the posterior wall of the aorta has been well documented as preceding IVD deterioration.

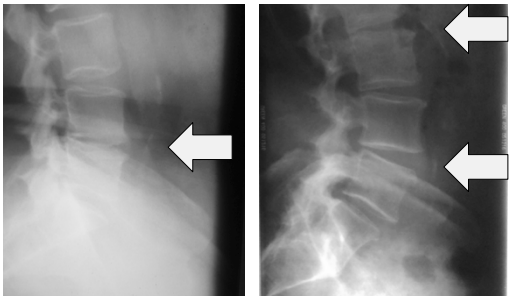
Insufficient blood supply may be a **significant causative factor** in intervertebral disc degeneration leading to lower back pain.

Wang y, Videman T, Battié MC, ISSLS prize winner: Lumbar vertebral endplate lesions: associations with disc degeneration and back pain history. *SPINE,* 2012 Aug 1;37 (17):1490-96.

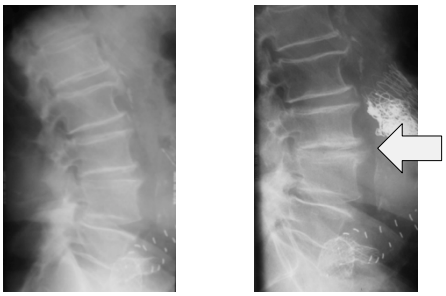
Kauppila LI, McAlindon T, Evans S, et al. Disc degeneration/back pain and calcification of the abdominal aorta. A 25-year follow-up study in Framingham, *SPINE,* 1997; 22:1642-47.

Kurunlahti M, Tervonen O, Vanharanta H, Ilkko E, Suramo I. Association of atherosclerosis with low back pain and the degree of disc degeneration. *SPINE,* 1999; 24:2080-84.

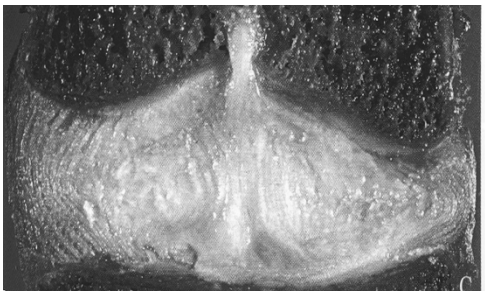
Nutrition of the Disc



Nutrition of the Disc



Nomenclature



Nomenclature

Stages of Degeneration

- End Plate Disruption
- Annular Disruption
- Destabilized Nucleus
- Altered Diffusion of O2 and Nutrients
- Secretion of Proteolytic Enzymes
- Further Damage to the Annulus

Beattie P, PT, PhD, *Journal of Orthopaedic & Sports Physical Therapy, 2008*, Volume: 38 Issue: 6 Pages: 329-340 doi:10.2519/jospt.2008.2768

Nomenclature

Stages of Degeneration

- Altered Load Bearing
- Disc Space Narrowing
- Formation of Osteophytes

Beattie P, PT, PhD, *Journal of Orthopaedic & Sports Physical Therapy, 2008,* Volume: 38 Issue: 6 Pages: 329-340 doi:10.2519/jospt.2008.2768

Nomenclature

"Future research should address mechanisms by which non-invasive, low-risk interventions, such as lumbar manipulation, traction, and exercise, influence the physiologic properties and natural history of disc degeneration."

Beattie P, PT, PhD, *Journal of Orthopaedic & Sports Physical Therapy, 2008,* Volume: 38 Issue: 6 Pages: 329-340 doi:10.2519/jospt.2008.2768

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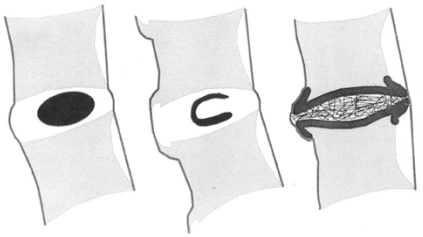
Nomenclature



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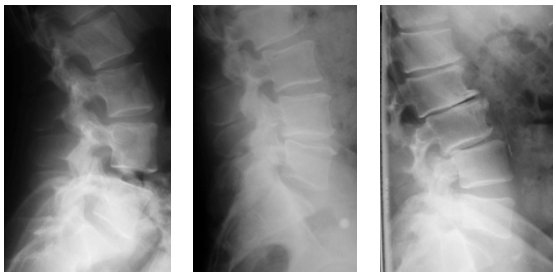
Stages of Degeneration



Normal **Spondylosis Deformans** **Intervertebral Osteochondrosis**

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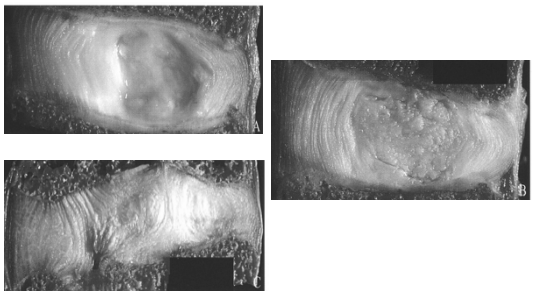
Nomenclature



Nomenclature

- For the general diagnosis of displacement of disc material, the single term that is most commonly used and creates less confusion is: "Herniated Disc"
- Herniated Disc is defined as a localized displacement of disc material beyond the normal margins of the intervertebral disc space.

Nomenclature

MRI Reports Terminology

- Localized
- Generalized
- Focal
- Broad based
- Symmetrical
- Protrusion
- Extrusion
- Bulging

Nomenclature

Focal Herniation

- Involves less than 25% of the disc circumference.

Broad Based Herniation

- Involves between 25% and 50% of the disc circumference.

Symmetrical Bulging Disc

- Circumferentially 50-100% beyond the disc circumference.

Nomenclature

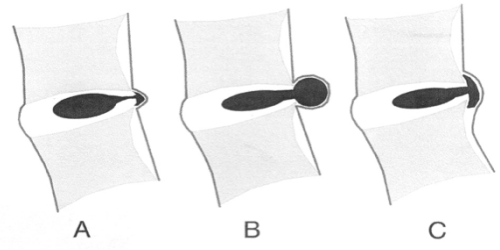
Protrusion

Is present if the greatest distance, in any plane, between the edges of the disc material beyond the edges of the disc space is less than the distance between the edges of the base, in the same direction.

Extrusion

Is present when, in at least one plane, any one distance between the edges of the disc space is greater than the distance between the edges of the base, or when no continuity exists between the disc space.

Nomenclature



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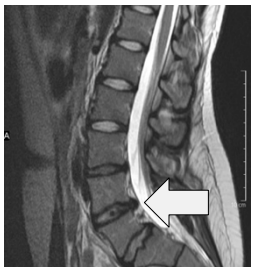

Anatomy and Physiology Review

- Design features of the disc
- Nutrition of the disc
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Decompression Technology

The non-invasive option for your patients

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The "Why" of Decompression

The advances in decompression

The "Why" of Decompression

- Traditional management based on rest and passive care **has been unsuccessful**, actually promoting disability
- Decompression **alleviates conditions of low back pain** and associated radiculopathy
- Technology has proven that **discs and nerves can be effectively decompressed non-surgically**

Annual Review of Hospital & Healthcare Planning and Development: London, UK 2005

The "Why" of Decompression

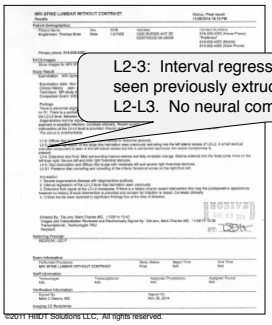
Non-surgical Axial Spinal Decompression Defined

Decompression Treatment is a comprehensive **program, not just a table**.

- Increases blood flow, improving nutrition to the disc.
- Decreases intradiscal pressure.
- Promotes the regression of disc herniation.
- Reduces neurocompression.

The "Why" of Decompression

The "Why" of Decompression

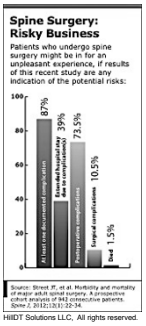


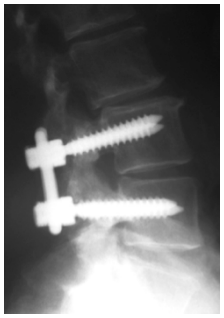
L2-3: Interval regression of the large disc herniation seen previously extruding into the left lateral recess of L2-L3. No neural compromise is present.

The "Why" of Decompression

- **Decompression** technology addresses the **biomechanical** aspects of disc disease in a non-invasive method.
- Clinical studies have documented the ability to actually **lower the intradiscal pressure to negative levels!**
- Research has confirmed that **disc rehydration** can be achieved in degenerative discs.

The "Why" of Decompression





The "Why" of Decompression

- Cost effective alternative to surgery
- High risk patients, ie: diabetic
- Previous surgical complications
- Chronic lumbar or cervical pain without any clear causation
- Failure to pass the anesthesia assessment
- Pose a high risk for infection
- Wanting alternative option to surgery

The "Why" of Decompression

Orthopaedic Surgeons Largely Contribute to Opioid Epidemic

"The United States makes up less than 5% of the world's population but consumes 80% of the global opioid supply and approximately 99% of all hydrocodone – the most commonly prescribed opioid in the world."

American Academy of Orthopaedic Surgeons
Press Release, "The Opioid Epidemic and Its Impact on Orthopaedic Care," May 7, 2015.

The "Why" of Decompression

Why the chiropractic component is essential.

The Pran Magna Report (1993)

- Many medical therapies are of questionable validity or are clearly inadequate but others are unsafe and generate iatrogenic complications for LBP patients.
- Chiropractic manipulation is safer than medical management of low-back pain.

Pran Manga, PhD; Doug Angus, MA; Costa Papadopoulos, MPH; William Swan, BA; The Effectiveness and Cost-Effectiveness of Chiropractic Management of Low-Back Pain; *Ontario Ministry of Health*; Kenilworth Publishing; 1993.

Pran Manga, PhD; Doug Angus, MA; Enhanced Chiropractic Coverage Under OHIP as a Means of Reducing Health Care Costs: Attaining Better Health Outcomes and Achieving Equitable Access to Health Services; *Ontario Ministry of Health*; 1993.

Decompression Research

Effects of Vertebral Axial Decompression on Intradiscal Pressure, **Journal of Neurosurgery 1994**

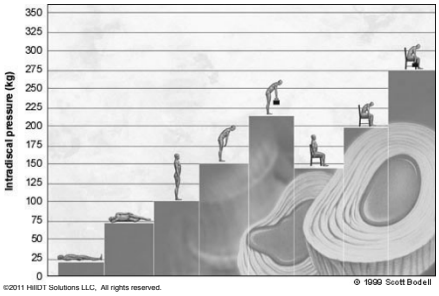
Abstract:

The object of the study was to examine the effect of vertebral axial decompression on pressure in the nucleus pulposus of lumbar discs. Intradiscal pressure measurement was performed by connecting a cannula inserted into the patients L4/L5 disc space to a pressure transducer. Changes in intradiscal pressure were recorded at resting state and while controlled tension was applied by the equipment to a pelvic harness. Intradiscal pressure was decreased in the nucleus to below -100 mm HG.

G. Ramos MD, W Martin MD, Journal of Neurosurgery 1994

Decompression Research

Intradiscal Pressure Chart



Decompression Research

Lumbosacral Radiculopathy: The Impact of Forward Head Posture, **JMPT**, 2015

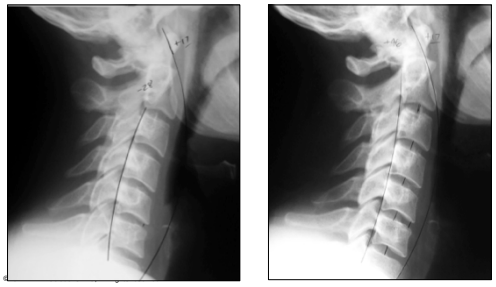
Conclusion:

"Forward head posture correction as part of a functional restoration program positively affected disability, back pain, leg pain and S1 nerve root function of patients with chronic discogenic lumbosacral radiculopathy."

Moustafa IM, et al. The effect of adding forward head posture corrective exercises in the management of lumbosacral radiculopathy: a randomized controlled study. JMPT, Mar-Apr 2015; 38 (3): 167-78.

Decompression Research

Lumbosacral Radiculopathy: The Impact of Forward Head Posture



Decompression Research

Outcome Study: Vertebral Axial Decompression Therapy for Pain Associated with Herniated Discs, Degenerated Discs, or Facet Syndrome

- Outcomes of decompression therapy for patients with a diagnosis of **herniated disc, degenerated disc, or facet syndrome**.
- **778 cases**
- Average time between the initial onset of symptoms and beginning of this treatment was 40 months.

Gose, et al; Journal of Neurological Research April 1998

Decompression Research

Outcome Study: Vertebral Axial Decompression Therapy for Pain Associated with Herniated Discs, Degenerated Discs, or Facet Syndrome

- Data was collected from 22 medical centers in the USA.
- Average number of treatments: 17 facet syndrome, 19 disc degeneration and 20 HNP.
- Pain was rated on a scale from 0 to 5 with 5 severe pain.

Gose, et al; Journal of Neurological Research April 1998

Decompression Research

Outcome Study: Vertebral Axial Decompression Therapy for Pain Associated with Herniated Discs, Degenerated Discs, or Facet Syndrome

Treatment was considered a **success** when the original pain was reduced to 0 or 1.

Overall the treatment was successful 71% of the time.

- 73% - single herniated discs
- 72% - **multiple** herniated discs
- 68% - facet syndromes
- 68% - failed back surgery
- 53% - **extruded** herniated discs

Gose, et al; Journal of Neurological Research April 1998

Decompression Research

Prospective Case Series Study:
Protocols for Patients with Activity – Limiting Low Back Pain

- A total of 296 patients with low back pain and evidence of a degenerative and or herniated disc at 1 or more levels.
- 8 Week course of treatment = 24 sessions:

  Week 1 – 4: 5 times per week @ 30 minute session

  Week 5 – 8: 1 time per week @ 30 minute session

Beattie PhD, PT; Nelson PhD, PT; Cammarata DC
Archives of Physical Medicine and Rehabilitation Medicine February 2008

Decompression Research

- Numeric pain rating scale and the Roland Morris Disability Questionnaire were completed at pre-intervention, discharge, 30 days, and 180 days.
- All subjects must have reported a lack of favorable outcomes after at least 2 non-operative interventions.
- 0 – 10 Pain scale, 0 -24 scale Roland Morris
- The majority of the patients, 79%, reported their symptoms of LBP were present for greater than 6 months. (Chronic)

Beattie PhD, PT; Nelson PhD, PT; Cammarata DC
Archives of Physical Medicine and Rehabilitation Medicine February 2008

Decompression Research

Mean Pain Index Score

- Pre-intervention = 7.3
- Discharge = 5.0
- 30 Day = 4.7
- 180 Day = 4.3

Beattie PhD, PT; Nelson PhD, PT; Cammarata DC
Archives of Physical Medicine and Rehabilitation Medicine February 2008

Decompression Research

RMDQ Scores

- Pre-intervention = 12.6
- Discharge = 7.0
- 30 Day = 6.0
- 180 Day = 5.7

Beattie PhD, PT; Nelson PhD, PT; Cammarata DC
Archives of Physical Medicine and Rehabilitation Medicine February 2008

Decompression Research

Decompression Reduces Chronic Back Pain: 4 Year Study

- 91% - resumed normal daily activities
- 87% - working or retired without back pain
- 71% - had 50% reduction in pain immediately after treatment
- 86% - showed 50% or better pain reduction at four years.
- 52% - pain level of zero

R. Odell MD, D. Boudreau DO, Anesthesiology News March 2003

Decompression Research

Decompression Reduces Chronic Back Pain: 4 Year Study

Summary:

"*After 4 years, 52% of respondents reported a pain level of zero. Thus, pain relief not only lasted but improved.*"
R. Odell, MD

Excellent indicator that decompression treatment results last.

R. Odell MD, D. Boudreau DO, Anesthesiology News March 2003

Decompression Research

Disc Distraction Shows Evidence of Regenerative Potential in Degenerated Intervertebral Discs, **SPINE** 2006

Conclusion:

Disc repair fundamentally depends on the stage of disc degeneration. This study with respect to previous reports, confirms that disc distraction **enhances hydration** in the degenerated disc and may improve disc nutrition via the vertebral endplates.

Thorsten Guehring, MD, et al; Department of Orthopedic Surgery, University of Heidelberg, Germany
SPINE Volume 31, Number 15, 2006

Decompression Research

Traction vs. Decompression

Spinal decompression has shown to decompress the disc space, and in the clinical picture of low back pain is distinguishable from conventional spinal traction.

Ramos G, Martin W., Effects of vertebral axial decompression on intradiscal pressure. J Neurosurgery. 1994; 81:350-353

Mangion, et al concluded that any benefit derived from continuous traction devices was due to **enforced immobilization rather than actual traction**.

Mangion, et al; A controlled trail of continuous lumbar traction in back pain and sciatica. Br J Rheumatol. 1986; 25:181-183

Decompression Research

Long Term Effect Analysis of IDD Therapy in Low Back Pain: A Retrospective Clinical Pilot Study

- **Decompression** treatment rendered "good" to "excellent" relief in 86% of patients with herniated discs and 75% in patients with facet arthrosis.
- **Traction** yielded no "excellent" results in patients with herniated discs and only 50% "good" to "excellent" results with patients who were diagnosed with facet arthrosis.

Norman Shealy, MD, Phd, American Journal of Pain Management, Vol. 7 No. 2, April 1997

Decompression Research

Traction vs. Decompression

- Patients treated with **traction** compared to a control group that had **simulated traction** demonstrated **no significant differences** in outcome.
- Traditional traction does not produce spinal decompression.
- Decompression has been proven as an effective treatment for herniated and degenerative disc disease, by creating a negative intradiscal pressure.

Weber H., Traction therapy in sciatica. J Oslo City Hosp. 1973;23(10):167-176

Decompression Research

DAVENPORT UNIVERSITY

Outcome Study Data

- Clinical assessments: 2011-2014
- 163 Randomly chosen patients
- 54% Women, 46% Men
- 50% of cases were LBP

Decompression Research

DAVENPORT UNIVERSITY

Clinical outcome study 2014

- 91% success rate
- High patient satisfaction
- HillDT Solutions protocols
- HillDT table

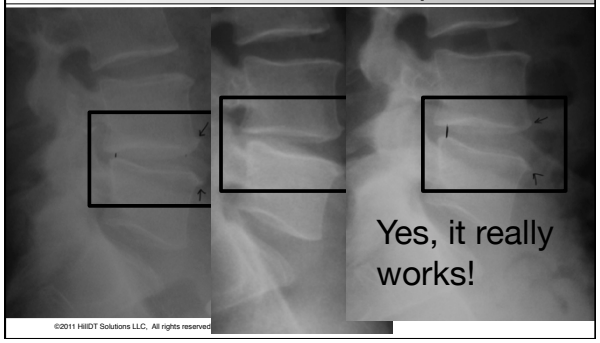
Biomechanics of Decompression

1. Vertebral separation, which may decrease intradiscal pressure and reduce bulging of nuclear material, and may enhance osmosis from vertebral endplates, increasing nutrients supply to the discs.
2. Separation and gliding of the facet joints, establishing potential for improved alignment and joint mobility.
3. Tensing, or stretching of spinal ligaments.

Biomechanics of Decompression

4. Widening of the vertebral foramina, allowing increased space for spinal nerve roots.
5. Stretching of the spinal musculature, potentially decreasing its sensitivity to stretch and thereby decreasing muscle spasms or guarding. This stretch may improve blood supply to the posterior soft tissues.

Biomechanics of Decompression



Decompression Technology Review

- The “why” of spinal decompression
- Decompression research
- Biomechanics of decompression

Decompression Treatment

The non-invasive option for your patients

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Indications for Spinal Decompression

Mechanical Pain

- Occurs from stretching a shortened tissue or compressing a displaced inflamed tissue.
- It is typically random or intermittent, occurring only when tissue is stretched or compressed (end range loading).
- Certain positions, postures or movements may cause the pain to develop, worsen, or decrease and possibly abate.

Indications for Spinal Decompression

Chemical Pain

- Occurs from inflammation, ischemia or noxious metabolites.
- Is typically constant and unrelenting.
- Certain positions or movements will aggravate or lesson the pain but **not** make it resolve.
- Patients can often draw a line of pain in a specific pattern.

Indications for Spinal Decompression

So who is a candidate?

The best candidates are patients who have any of the following conditions:

- Herniated disc
- Degenerative disc
- Facet syndrome
- Failed spinal surgery
- Failure to improve with at least 2 non-operative conservative treatment measures.

Indications for Spinal Decompression

Contraindications

1. Meningitis, arachnoiditis, etc.

Infections such as these can be spread when decompression is applied.

2. Spinal cancer

There is some evidence that mechanical decompression can increase the potential for metastases. Not to mention the possibility of instability in bone because of the cancer.

Contraindications

3. Bilateral signs

When the patient exhibits signs that indicate the cord itself may be compromised (Cauda Equina), mechanical decompression should not be employed. Decompression may aggravate such a condition.

4. Rheumatoid Arthritis (RA)

Joint capsules, ligaments, and even bone are all negatively affected by RA. Always keep in mind that RA can progress to include the atlantoaxial joint. Mechanical decompression of this joint could result in subluxation of this joint.

Contraindications

5. Recent fractures

Decompression could misalign a recent fracture sight.

6. Osteoporosis

When the bone density of a patient is questionable, decompression forces could result in fracture. Such a fracture could come from the decompression pull, but could also result from pressure associated from belts and harnesses. Example: osteoporotic ribs.

7. Abdominal pressure issues

Patients who have conditions such as hiatal hernias, uncontrolled hypertension, aortic aneurysm, or even severe hemorrhoids may not tolerate decompression.

Contraindications

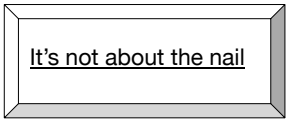
8. Pregnancy
9. Cardiac or respiratory insufficiency
10. Decompression anxiety
11. Joint hyper-mobility

Contraindications

12. Acute joint injury
13. Active or pending spondylolisthesis vs. inactive
14. Certain vertebral fusions
15. High FABQ score

Contraindications

The **FABQ** factor



https://www.youtube.com/watch?v=-4EDhdAHrOg

Contraindications

The **FABQ** factor (**F**ear-**A**voidance-**B**elief-**Q**uestionnaire)

Obtain a FABQ evaluation form on each decompression candidate: If the score is **20 or higher**, the patient is **female**, they have had **LBP** over six months with the secondary finding of **neck pain** and are being compensated due to **disability** the patient is a poor candidate.

Eur Spine J. 2008 Jan;17(1):70-9. Epub 2007 Oct 10.
Predictive validity of initial fear avoidance beliefs in patients with low back pain receiving physical therapy: is the FABQ a useful screening tool for identifying patients at risk for a poor recovery?
Cleland JA1, Fritz JM, Brennan GP.

Contraindications

LBP Predictors Of Non-Success

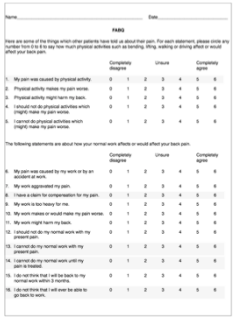
Leboeuf-yde C, et al (2004) The Nordic Back Pain Subpopulation Program: Clinical Predictors for Outcome in Patients Receiving Chiropractic Treatment for Persistent Low Back Pain. *JMPT Ther 27(8) 493-502*

- Patients who were not significantly improved by 4th visit had a poorer long term outcomes at 3 and 12 months.
- 5 variables are predictive of poorer success with treatment:

1. Female gender
2. Receiving social compensation
3. Moderate to severe pain
4. 1st visit: pain duration longer than 6 months
5. Additional complaint of persistent neck pain.

* Interesting to note that **No Physical Exam** findings were predictive of poorer long term outcomes.

Contraindications



FABQ

Name_____ Date_____

Here are some of the things which other patients have told us about their pain. For each statement, please circle any number from 0 to 6 to say how much physical activities such as bending, lifting, walking or driving affect or would affect your back pain.

	Completely disagree			Unsure		Completely agree
1. My pain was caused by physical activity.	0	1	2	3	4	5	6
2. Physical activity makes my pain worse.	0	1	2	3	4	5	6
3. Physical activity might harm my back.	0	1	2	3	4	5	6
4. I should not do physical activities which (might) make my pain worse.	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse.	0	1	2	3	4	5	6

The following statements are about how your normal work affects or would affect your back pain.

	Completely disagree			Unsure		Completely agree
6. My pain was caused by my work or by an accident at work.	0	1	2	3	4	5	6
7. My work aggravated my pain.	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain.	0	1	2	3	4	5	6
9. My work is too heavy for me.	0	1	2	3	4	5	6
10. My work makes or would make my pain worse.	0	1	2	3	4	5	6
11. My work might harm my back.	0	1	2	3	4	5	6
12. I should not do my normal work with my present pain.	0	1	2	3	4	5	6
13. I cannot do my normal work with my present pain.	0	1	2	3	4	5	6
14. I cannot do my normal work until my pain is treated.	0	1	2	3	4	5	6
15. I do not think that I will be back to my normal work within 3 months.	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to work.	0	1	2	3	4	5	6

FABQ Scale Key:

Questions 1-5:
Do not count questions #1 into your total.

Questions 6-16:
Do not count questions #8, 13, 14 and 16 into your total.

The "How" of Decompression

The 4 "C's" to a successful decompression practice

- Compassion
- Clarity
- Certainty
- Credibility

The "How" of Decompression

- When combined with the **proper technique**, axial spinal decompression therapy can stretch the spine to open disc spaces and IVFs.
- Decompression decreases the intradiscal pressure and promotes an increase in blood flow to the disc which brings in important nutrition to aid in healing and reduction of inflammation.
- Annular and nuclear material may be drawn back in by the negative pressure created by the decompression.

Computed Tomographic Evaluation of Lumbar Spinal Structures during Traction 2005, Vol. 21, No. 1 , Pages 3-11
Hidayet Sari, MD, Ulku Akarimak, MD, etal.

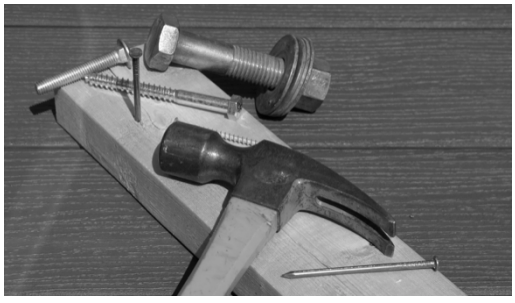
The "How" of Decompression

DESCRIPTION
Decompression therapy is more than a **machine**.

For results to occur these goals must be achieved:

1. Decompression
2. Mobilization
3. Strengthening
4. Education
5. Prevention

The "How" of Decompression



The "How" of Decompression

The 5 components of the treatment program are:

1. Pre-decompression treatment or therapy
2. Decompression treatment with specific protocols
3. Manual or manipulative therapy
4. Nutritional recommendations and support
5. Postural rehab with both active and passive therapies

The "How" of Decompression

Why the chiropractic component is essential.

The Early Predictors of Lumbar Spine Surgery Study (2013)

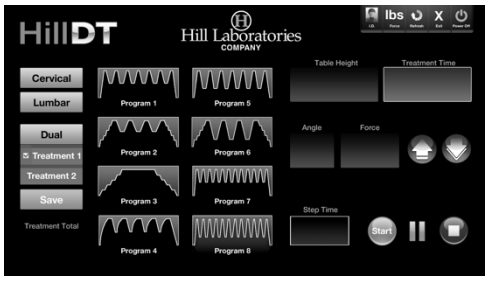
- Odds of surgery were greatly reduced for those whose first provider was a chiropractor.
- Data revealed 42.7 % of workers who first saw a surgeon had surgery, in contrast to only 1.5% of those who saw a chiropractor, as their first provider.

Keeney, et al, "Early Predictors of Lumbar Spine Surgery after Occupational Back Injury; Results from a Prospective Study of Workers in Washington State," SPINE. 38(11): 953-964. May 15, 2013

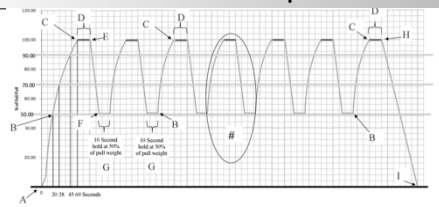
The "How" of Decompression

Anterior Conditions	**Posterior Conditions**
25% of the patient's body weight +/- 10 lbs. May increase pull weight to up 50% of the patient's weight.	33% of the patient's body weight
Rest: 25-50 % of hold force	**Rest:** 50% or 25% of hold force

The "How" of Decompression



The "How" of Decompression



A-B = From zero lbs, start with a very very slow start, slowly getting faster until 20seconds, at that point you should be at 50% of the total set pull weight. 20 seconds
B-C = 8 seconds more to reach 70% of the pull weight , Then 17 seconds to reach 90% Then 15 seconds to reach 100% of the set pull weight (8+17+15= 40seconds)
D = is a 20 second hold at 100% of full pull weight
E-F = Ramp down from 100% of full pull down to 50% of set pull weight time 20 seconds
G = is 10 second hold at 50% of full pull weight
# = This is a repeat of (B-C-D-E-F-G) 90 second cycle

Final ramp is (B-C-D-H) with a H-I is a 40 second down to zero, 40 seconds up, 20 second hold at 100% , then down to zero over 40 seconds. 100 seconds, in total final ramp/pull

First Pull , A-B-C-D-E-F-G = 110 Seconds in total — 110 seconds
Cycle Pulls, B-C-D-E-F-G = 90 Seconds in total , 16 cycles = 1,440 seconds
Final Pull, B-C-D-E-H-I = 100 Seconds in total — 100 seconds
} 18 total pulls over 27 and half minutes

20 Second hold at 100% of pull weight
20 Second hold at 100% of pull weight

The "How" of Decompression

The recommended schedule of visits is as follows:
(a minimum effective dosage of 24 decompression treatments)

- 4-5 times the first week
- 3 times a week for 3-4 weeks
- 1-2 times a week for 3-4 weeks
- Re-evaluation after 2-4 weeks

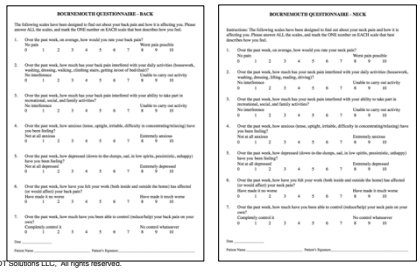
The "How" of Decompression

The order of treatment during each visit:

1. Laser, ACT, e-stim, heat/ice or ultrasound as pre-decompression therapy
2. Decompression on the Hill DT table
3. Manipulation or manual therapy of the segmental dysfunction
4. Posture rehab exercises

The "How" of Decompression

The Bournemouth Cervical/Lumbar Assessment questionnaire will be completed by the patient on the 1st, 8th, 18th, and 24th visit.



BOURNEMOUTH QUESTIONNAIRE - BACK

The following scales have been designed to find out about your back pain and how it is affecting you. Please answer ALL the scales, and mark the ONE number on EACH scale that best describes how you feel.

1. Over the past week, on average, how would you rate your back pain?
No pain — Worst pain possible
0 1 2 3 4 5 6 7 8 9 10

2. Over the past week, how much has your back pain interfered with your daily activities (housework, washing, dressing, walking, climbing stairs, getting in/out of bed/chair)?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

3. Over the past week, how much has your back pain interfered with your ability to take part in recreational, social, and family activities?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

4. Over the past week, how anxious (tense, uptight, irritable, difficulty in concentrating/relaxing) have you been feeling?
Not at all anxious — Extremely anxious
0 1 2 3 4 5 6 7 8 9 10

5. Over the past week, how depressed (down-in-the-dumps, sad, in low spirits, pessimistic, unhappy) have you been feeling?
Not at all depressed — Extremely depressed
0 1 2 3 4 5 6 7 8 9 10

6. Over the past week, how have you felt your work (both inside and outside the home) has affected (or would affect) your back pain?
Have made it no worse — Have made it much worse
0 1 2 3 4 5 6 7 8 9 10

7. Over the past week, how much have you been able to control (reduce/help) your back pain on your own?
Completely control it — No control whatsoever
0 1 2 3 4 5 6 7 8 9 10

Date _____
Patient Name _____ Patient's Signature _____

BOURNEMOUTH QUESTIONNAIRE - NECK

Instructions: The following scales have been designed to find out about your neck pain and how it is affecting you. Please answer ALL the scales, and mark the ONE number on EACH scale that best describes how you feel.

1. Over the past week, on average, how would you rate your neck pain?
No pain — Worst pain possible
0 1 2 3 4 5 6 7 8 9 10

2. Over the past week, how much has your neck pain interfered with your daily activities (housework, washing, dressing, lifting, reading, driving)?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

3. Over the past week, how much has your neck pain interfered with your ability to take part in recreational, social, and family activities?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

4. Over the past week, how anxious (tense, uptight, irritable, difficulty in concentrating/relaxing) have you been feeling?
Not at all anxious — Extremely anxious
0 1 2 3 4 5 6 7 8 9 10

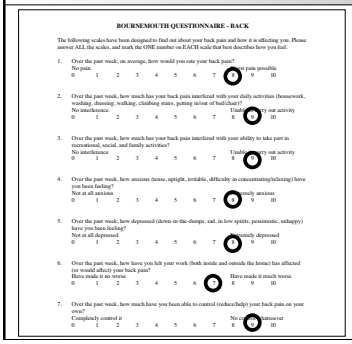
5. Over the past week, how depressed (down-in-the-dumps, sad, in low spirits, pessimistic, unhappy) have you been feeling?
Not at all depressed — Extremely depressed
0 1 2 3 4 5 6 7 8 9 10

6. Over the past week, how have you felt your work (both inside and outside the home) has affected (or would affect) your neck pain?
Have made it no worse — Have made it much worse
0 1 2 3 4 5 6 7 8 9 10

7. Over the past week, how much have you been able to control (reduce/help) your neck pain on your own?
Completely control it — No control whatsoever
0 1 2 3 4 5 6 7 8 9 10

Date _____
Patient Name _____ Patient's Signature _____

The "How" of Decompression



BOURNEMOUTH QUESTIONNAIRE - BACK

The following scales have been designed to find out about your back pain and how it is affecting you. Please answer ALL the scales, and mark the ONE number on EACH scale that best describes how you feel.

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No pain — Worst pain possible
0 1 2 3 4 5 6 7 8 9 10

2. Over the past week, how much has your back pain interfered with your daily activities (housework, washing, dressing, walking, climbing stairs, getting in/out of bed/chair)?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

3. Over the past week, how much has your back pain interfered with your ability to take part in recreational, social, and family activities?
No interference — Unable to carry out activity
0 1 2 3 4 5 6 7 8 9 10

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Not at all anxious — Extremely anxious
0 1 2 3 4 5 6 7 8 9 10

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Not at all depressed — Extremely depressed
0 1 2 3 4 5 6 7 8 9 10

6. Over the past week, how have you felt your work (both inside and outside the home) has affected (or would affect) your back pain?
Have made it no worse — Have made it much worse
0 1 2 3 4 5 6 7 8 9 10

7. Over the past week, how much have you been able to control (reduce/help) your back pain on your own?
Completely control it — No control whatsoever
0 1 2 3 4 5 6 7 8 9 10

Bournemouth score of 58

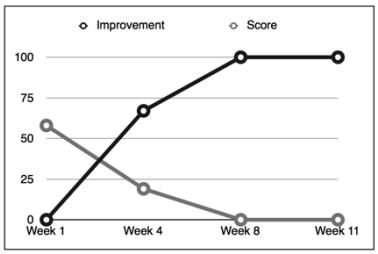
58 ÷ 70 = 0.82

0.82 x 100 = 82%

Total disability percentage is 82%

The "How" of Decompression

Function will always return or improve before pain indices decline.



The "How" of Decompression

Re-evaluation, following the "test" of time

90-100% - improved, re-evaluate with exam, x-rays or follow-up MRI and release to maintenance or wellness care for 6 more decompression visits, 1 per month & then re-evaluate again after 6 months.

70-80% - improved, re-evaluate & recommend 6 more decompression visits, 1 per week for 6 more weeks, then re-evaluate. May need up to 30 visits for full recovery.

The "How" of Decompression

Re-evaluation, following the "test" of time

40-60% - improved, re-evaluate & continue with 12 more visits over the next 6 weeks at 2/week, then re-evaluate.

<40%-No Improvement - follow up with 1 of 2 things:

Immediately request a MRI, for further evaluation.

Expand the treatment protocol to 10 additional visits at 5/week for 2 weeks, then re-evaluate.

Decompression Treatment Review

- Indications for decompression
- Contraindications
- The "how" of decompression

Implementation into Clinics

The non-invasive option for your patients

Agenda

1. Anatomy and Physiology
- Design features of the disc
- Nutrition of the disc
- Nomenclature

2. Decompression Technology
- The "why" of spinal decompression
- Decompression research
- Biomechanics of decompression

3. Decompression Treatment
- Indications for treatment
- Contraindications
- The "how" of decompression

4. Implementation into Practice
- Implementation
- Case studies
- Open discussion

Implementation

The 5 components of the treatment program:

1. Pre-decompression treatment or therapy
2. Decompression treatment with the HillDT table
3. Manipulative therapy
4. Nutritional recommendations and support
5. Postural rehab with both active and passive therapies

Implementation

The 4 "C's" for a successful decompression practice

- Compassion
- Clarity
- Certainty
- Credibility

Implementation

The Hill DT Distinction

HillDT Treatment Model	**Traditional Treatment Model**
• Health	• Disease
• Holistic approach	• Individual body parts
• Internal recuperative forces	• External invasive forces
• Treating people	• Treating disease
• Internal controls	• External controls
• Natural	• Artificial
• Proactive	• Reactive

Implementation

Key points in implementation

- The "trial" decompression treatment
- Capture errors
- Proper pre-load
- Stop switch errors
- Extra padding if needed
- Never surrender your clinical judgment!
- Adjust treatment for decompression adaptation
- If patient is progressing do not change the settings

Implementation

W.H.O. Definition of Rehabilitation:

Rehabilitation includes a wide range of activities in addition to medical care, including physical, psychosocial, and occupational therapy.

It is a process aimed enabling people with disabilities to reach and maintain their optimal physical, sensory, intellectual, psychological and or social functional levels.

Implementation

Goals For Rehab

1. Restoration of Function
2. Fostering Self-Reliance and Independence

These Goals Are Accomplished By:

- Analysis of physical & psychosocial impairments
- Formation of a treatment plan to overcome or reduce these impairments
- Exercise, core stabilization, posture re-education, assistive devices and an emphasis on active care strategies to achieve these goals.

M. Schneider, Rehabilitation in a Nutshell, 2006

Implementation

Passive Care

Doctor/Clinician is the **healer** and the patient is the **passive recipient**.

- Manipulation, decompression, mobilization, myofascial release
- Modalities, lasers, ultrasound, braces

Active Care

Doctor/Clinician is the **helper** the patient is the **active participant.**

- Strengthening and stretching
- Postural training, balance and co-ordination exercises.

Implementation

Key Points

- Primary emphasis is on improving function rather than **reduction** of **pain**.
- The doctor is **helper** rather than healer.
- Patient' s role is **active** participant rather than passive recipient of care.
- Focus is on **disabilities** and impairments rather than the diagnosis.
- Involves lifestyle **changes** and behavioral education in order to promote independence.

Implementation

Decompression Stabilization Exercises

Loss of coordinative control/co-contraction and endurance of the core musculature not necessarily strength, is an underlying source of low back pain and susceptibility to disc injury.

Richardson C, Jull G et al: Therapeutic exercises for spinal segmental stabilization in low back pain. Churchhill Livingstone NY, 1999

Implementation

Decompression Stabilization Exercises

1. RMT Table for ROM Restoration
2. Cervical Posture Pump
3. Exercise Ball
4. 'The Perfect Seven' Exercises
5. Additional Home Exercises

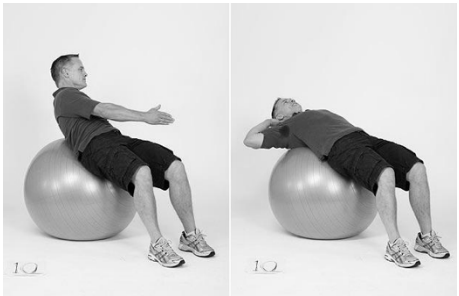
Implementation

'The Perfect Seven'

1. Curl Ups (Core Abs) Rectus Abdominal
2. Side Ups (Core Abs) Oblique Muscles
3. Bird Dogs (Spinal Extensors)
4. Short Arc Extensions (Spinal Extensors)
5. Squats (Gluts and Quads)
6. Lunges (Gluts and Quads)
7. Bridges (Gluts and Quads)

Curl Ups

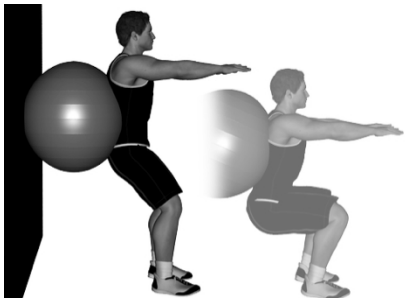
Side Ups (Oblique)



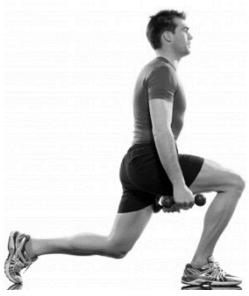
Bird Dogs

Short Arc Extensions

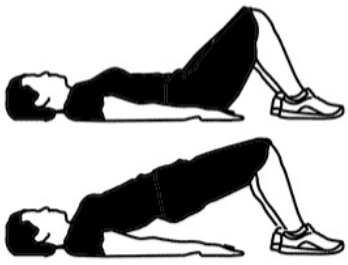
Squats



Lunges



Bridges



Implementation

Decompression Nutritional Program

Implementation

Nutritional Supplements

- First look at the patients pro-inflammatory diet as a possible cause for their pain/inflammation. Then address what chemical mediators are at work in the patient.
- With musculoskeletal supplementation, the doctor needs to stock only 5-9 supplements to handle most patients pro-inflammatory states.

Implementation

Nutritional Protocols

Joint trauma: sprains, strains, pain and inflammation control

1. Proteolytic Enzymes: Bromelain and Trypsin are ideal
2. Turmeric: natural Cox-2 Inhibitor
3. Vitamin C
4. Boswella: natural Cox-2 inhibitor
5. Antioxidant/Bioflavonoid mix - Vitamin B1

Implementation

6. Chondroitin Sulfate
7. White Willow: pain reliever and anti-inflammatory
8. Fish Oil: EPA/DHA is a natural anti-inflammatory
9. Quercetin: An anti-inflammatory and anti-oxidant. (Apples and Red Onions)
10. **Change Food Habits**

Implementation

Nutritional Protocols: Intervertebral Disc Injury

1. Manganese
2. Magnesium
3. Zinc (Arginate may be best form)
4. Chondroitin Sulfate
5. Fish Oil (EPA/DHA inhibit pro-inflammatory eicosanoids)

Implementation

6. High Potency Vitamin/Mineral Formula
7. Gotu Kola: Can promote healing of wounds by speeding collagen formation and helping blood vessels form.
8. MSM: reduces swelling/inflammation, Helps healing process speed up
9. Shark Cartilage, Sea Cucumber, Green Tea Extract, are showing some positive results in early tests.
10. Hyaluronic acid

Implementation

Complimentary therapy with the Decompression Treatment

Laser Therapy

- **Reduce Pain**
- **Accelerate Recovery**
- **Promote Natural Healing**
- **New Revenue**
- **Faster Treatment Times**
- **Easy Implementation**

Implementation

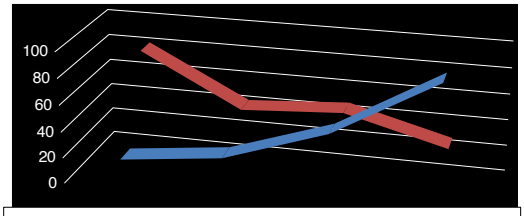
Complimentary therapy with the Decompression Table

PiezoWave²

Myofascial Acoustic Compression Therapy

- **Trigger Points**
- **Myofascial Dysfunction**
- **Tendinopathy**
- **Soft Tissue Strains**
- **Repetitive Stress Injuries**

Case Studies



Average patient response to decompression treatment is that spinal function will return before pain resolves.

Case Studies

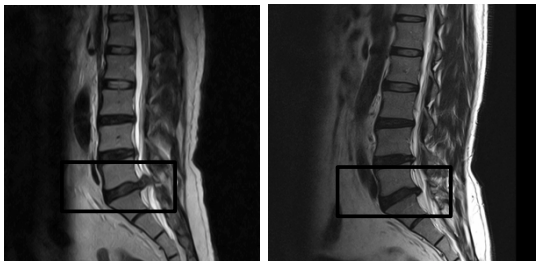
40 Year Old Male

Low back pain for 2 years with sciatica for 6 months.
Presented May 2014 with severe pain, unable to stand or sit for more than 3 minutes & weak extensors of big toe with weak dorsiflexion of foot.

HillDT Decompression Therapy

- 22 sessions with the HillDT for 8 weeks.
- Pain started to reduce after 10-12 sessions of therapy.
- After 22 sessions remarkable improvement from his initial condition and is pain free.

Case Studies



Case Studies

42 Year Old Female

Presented in wheelchair, unable to walk, with history of recurrent low back pain.
Failed discectomy at L5-S1 from 2 years prior.
L4-5 Disc prolapse with severe pain radiating to her right leg.

HillDT Decompression Therapy

- HillDT table + HillDT protocols.
- After 5 sessions no longer needed wheelchair.
- Pain went from 9 to zero in 10 sessions.
- She was able to walk and return to work after 12 sessions.
- After 20 sessions complete recovery.

Case Studies

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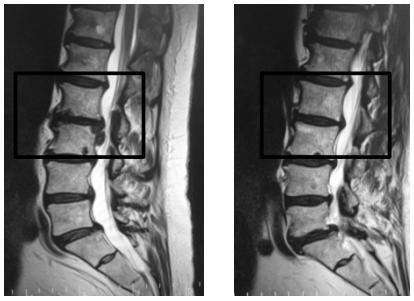
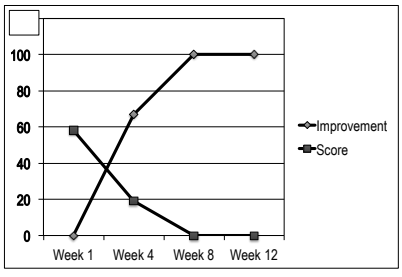


Case Studies



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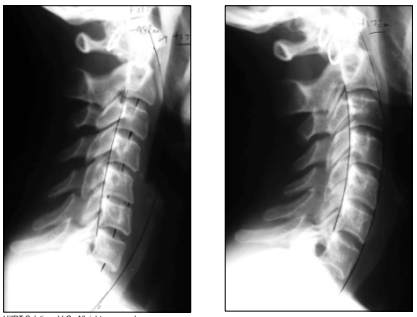

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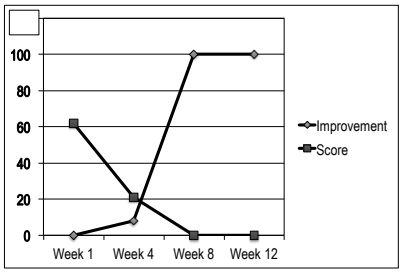

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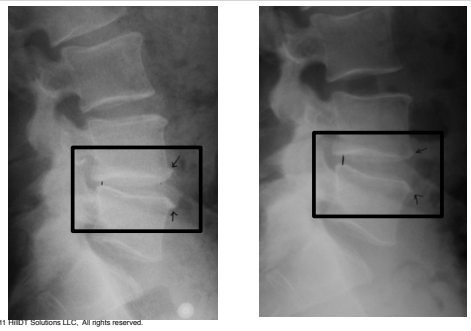

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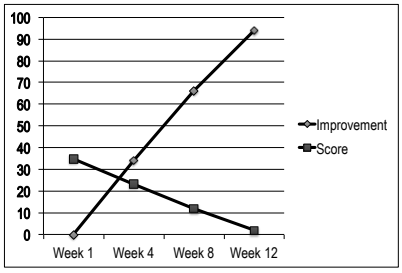

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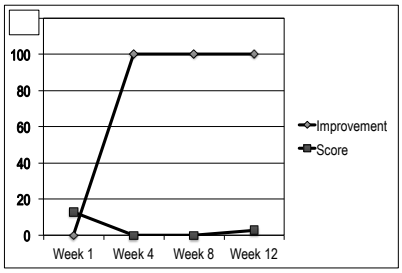

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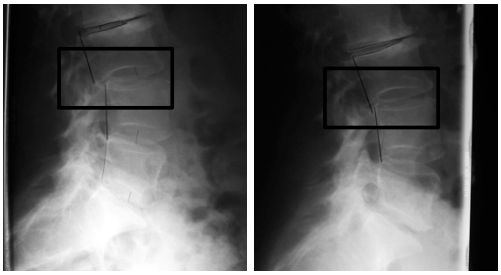

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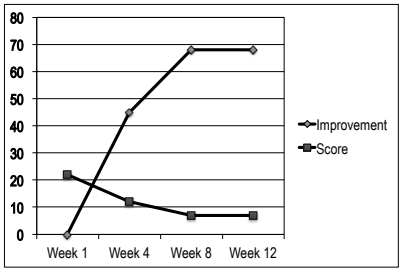

Open Discussion

- Anatomy and Physiology
- Decompression Technology
- Decompression Treatment
- Implementation into Practice